Claims

1. Method for purifying and/or isolating high-molecular compounds contained in a solution or a suspension with the capacity for metal chelate formation, comprising the steps:

(a) Application of the solution or suspension onto a metal ions containing membrane, and

(b) affinity chromatographic separation of the high-molecular compounds by binding them to the metal ion containing membrane.

2. Method according to Claim 1, wherein the high-molecular compounds have a molecular weight greater than $1x10^6$ Da.

3. Method according to Claim 1 or 2, wherein the high-molecular compounds are selected from the group consisting of high-molecular proteins, high-molecular protein-like compounds, high-molecular biopolymers, high-molecular lipids, micelles having a high molecular weight and liposomes having a high molecular weight.

4. Method according to one of Claims 1 to 3, wherein the metal ions are selected from the group consisting of Cu^{2+}, Ni^{2+}, Zn^{2+}, Co^{2+}, Fe^{3+}, Mn^{2+} and Ca^{2+} and mixtures thereof.

5. Method according to Claim 4, wherein the metal ion is Cu^{2+}.

6. Method according to one of Claims 1 to 5, wherein the membrane is a matrix material selected from the group consisting of agaroses, modified agaroses, modified dextranes, polystyrenes, polyethers, polyacrylamides, polyamides, cellulose, modified celluloses,

such as cross-linked celluloses, nitrocelluloses, cellulose acetates, silicates and poly(meth)acrylates, polytetrafluoroethylene, polyesters, polyvinyl chlorides, polyvinylidene fluoride, polypropylene, polysulfones and polyethersulfones.

7. Method according to one of Claims 1 to 6, wherein the metal ions containing membrane has a pore size in the range of 0.01 to 12 μm, preferably in the range of 0.45 to 7 μm, especially preferably in the range of 3 to 5 μm.

8. Method according to one of Claims 3 to 7, wherein the high-molecular protein-like compounds are selected from the group consisting of (poly)peptides and derivatives thereof, derivatized proteins, recombinant proteins and (poly)peptides, di-, tri-, tetra- to multimers of peptides, polypeptides or proteins, (multi)-protein complexes, cell organelles, fusion proteins, viruses or parts thereof, recombinant viruses or parts thereof, and recombinant bacteriophages or parts thereof.

9. Method according to one of Claims 1 to 8, wherein a mixture containing the high-molecular compounds is subjected to ion exchange chromatography to remove impurities prior to step (a).

10. Method according to Claim 9, wherein the ion exchange chromatography is performed using an ion exchanger membrane.

11. Method according to Claim 10, wherein the ion exchanger membrane comprises a matrix material selected from the group consisting of agaroses, modified agaroses, modified dextranes, polystyrenes, polyethers, polyacrylamides, polyamides, cellulose, modified celluloses, such as cross-linked celluloses, nitrocelluloses, cellulose acetates, silicates and poly(meth)acrylates, polytetrafluoroethylenes, polyesters, polyvinyl chlorides, polyvinylidene fluoride, polypropylenes, polysulfones and polyethersulfones.

12. Method according to Claim 10 or 11, wherein the ion exchanger membrane has a pore size in the range of 0.01 to 12 μm, preferably in the range of 0.45 to 7 μm, and especially preferably in the range of 3 to 5 μm.

13. Method according to one of Claims 10 to 12, wherein the functional groups of the ion exchanger membrane are selected from the group consisting of DEAE, DEA, CM, QA, TMA, S, SP and phosphate groups.

14. Method according to one of Claims 9 to 13, wherein the impurities comprise bacterial endotoxins, culture medium components and impurities of culture medium components.

15. Method according to one of Claims 1 to 14, wherein, prior to step (a) and/or prior to the ion exchange chromatography according to one of Claims 9 to 14, a mixture containing the high-molecular compounds is subjected to filtration using a filtration membrane for the removal of additional impurities.

16. Use of the high-molecular compounds purified and/or isolated in accordance with one of Claims 1 to 15 as biologically active components in a pharmaceutical composition, which optionally contains a pharmaceutically acceptable carrier and/or diluent.